REMARKS

The Office Action mailed February 12, 2004 has been carefully reviewed and the foregoing amendments have been made in consequence thereof.

Claims 6, 7, 10, 12-18, 20 are now pending in this application. Claims 6, 7, 10, 12-18, 20 stand rejected.

Applicants wish to thank Examiner for courtesies extended to the Applicants' representatives during a telephonic interview conducted March 1, 2004. During the interview the objection to the drawings and the section 112 rejection were discussed. Specifically, suggestions for illustrating the claimed embodiments more clearly was discussed. In addition, suggestions for describing the operation of the deflagration chamber and combustion chamber in the specification were discussed.

The objection to the drawings under 37 C.F.R. 1.83(a) is respectively traversed. Figures 3 and 4 have been added to more clearly illustrate features of the deflagration chamber claimed in Claims 12, 13, 16, and 17. No new material has been added because the new figures illustrate only that which was described with specificity in the original specification.

For the reasons set forth above, Applicants request that the objections to the drawings be withdrawn.

The rejection of Claims 6, 7, 10, 12-18, and 20 under 35 U.S.C. § 112, first paragraph is respectfully traversed.

With respect to the structure of deflagration chamber 100, Applicants have added Figures 3 and 4 to illustrate exemplary embodiments of deflagration chamber 100. In addition paragraphs [0013] and [0014] recite that deflagration chamber 100 is a "hollow chamber" that is "contoured and is positioned radially outwardly from centerbody 56 in flow communication with core engine 30." Moreover, lines 3-14 of paragraph [0014] recite additional structural considerations regarding deflagration chamber 100 including the

limitation that "an upstream end of deflagration chamber 100 is positioned a farther distance from centerbody 56 than a downstream end of deflagration chamber 100."

With respect to the detonation chamber 102, paragraph [0013], for example, recites that detonation chamber 102 is a "hollow chamber", and paragraph [0015], for example, recites that detonation chamber 102 is positioned at deflagration chamber downstream end 106 and in flow communication with deflagration chamber 100. Paragraph [0015] also recites that "[D]etonation chamber 102 is in serial, axial flow relationship with deflagration chamber 100." Moreover, as illustrated in Figures 1 and 2, at least a portion flow exiting deflagration chamber 100 enters detonation chamber 102.

With respect to the structure of the vaneless radial nozzles, Applicants have added Figure 5, which is a detailed view of the exemplary two-stage pulse detonation system shown in Figures 1 and 2, and described in the specification. The specification describes a function of the radial nozzle "accelerate[s] and direct[s] flow from the chamber 100 into detonation chamber 102", as is described in the specification at paragraph [0015], for example. Furthermore, at paragraph [0019], the specification further recites that "flow exiting deflagration chamber 100 enters detonation chamber 102 through the vaneless radial nozzle which operates above a critical pressure ratio, and combustion is initiated within detonation chamber 102." Paragraph [0019] further describes that the vaneless radial nozzle operates above a critical pressure ratio, "[b]ecause centerbody 56 is translated to second position 82 during the reheat mode of engine operation, the pressure ratio across the vaneless radial nozzle is increased," and that "[w]hen this pressure ratio reaches the critical value, detonation occurs within detonation chamber 102."

Applicants respectfully submit that the statement in the specification that "[f]uel is supplied to the deflagration chamber 100 such that chamber 100 is operated in a fuel-rich mode of operation" does not imply that no oxygen is available for detonation to occur in detonation chamber 102. For example, it is known that, to limit nitrogen oxide emissions from a gas turbine engine, portions of the combustion occurs in a fuel rich mode, and the exhaust still contains excess oxygen. In addition, paragraph [0019], for example, recites that detonation chamber 102 is in flow communication with flowpath 54, which includes

combustion gases discharged from core engine 30 and airflow exiting bypass duct 42 downstream through exhaust nozzle 50. Accordingly, Applicants submit that a detonation chamber 102 operated in a fuel-rich mode, and in flow communication with a flowpath containing core engine exhaust and engine bypass airflow has enough oxygen to detonate as described in the specification, and is not operated in the absence of oxygen.

Fuel in detonation chamber 102 detonates rather than deflagrates as described in Paragraph [0019] that recites:

> Flow exiting deflagration chamber 100 is directed into enters detonation chamber 102 by through the vaneless radial nozzle which operates above a critical pressure ratio, and combustion is initiated within detonation chamber 102. Because centerbody 56 is translated to second position 82 during the reheat mode of engine operation, the pressure ratio across the vaneless radial nozzle is increased. When this pressure ratio reaches the critical value, detonation occurs within detonation chamber 102. The resulting detonation shock pattern results in the temporary interruption of flow into chamber 102, the discharge of detonation products aftwards, and the initiation of a fresh charge of deflagration products through the radial nozzle. The cycle is repeated at a high frequency such that an amount of thrust from engine 10 is increased without impacting operation of core engine 30.

The specification describes that the pressure ratio across the vaneless radial nozzle triggers the detonation process in detonation chamber 102. As is known in the art, a pressure ratio of a nozzle is defined by its inlet area, outlet area, throat dimensions, the inlet pressure and outlet pressure. As the specification does not describe a nozzle with a similar function relative to deflagration chamber 100, conditions wherein detonation is triggered are not achieved in deflagration chamber 100.

Applicants respectfully submit that the level of skill in the art of gas turbine operation, and specifically gas engine pulse detonation operation is sufficiently high that the ordinarily skilled artisan would be able to fabricate the two-stage pulse detonation system described in the specification, as amended, in light of the figures, without the exercise of undue experimentation, and that the system would be capable of operation in the manner claimed and as generally disclosed by Applicants.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

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